

KS3 Chemistry

8G Rocks and Weathering

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Rocks and weathering

Rocks are different shapes and sizes because they are changed by the conditions in their environment.

The breakdown of rocks into smaller fragments is called **weathering**.

There are three types of weathering:

- physical weathering
- chemical weathering
- biological weathering

What factors cause these different types of weathering?

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How can freezing cause damage?

What will happen to a glass bottle containing a liquid if it is left in a freezer for too long?

It shatters!

The liquid inside the bottle **expands** as it freezes.

The ice formed creates huge forces on the glass which then cause the bottle to break!

How does this explain why water pipes often burst in winter?

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Rocks and weathering

Why are rocks all different shapes and sizes?

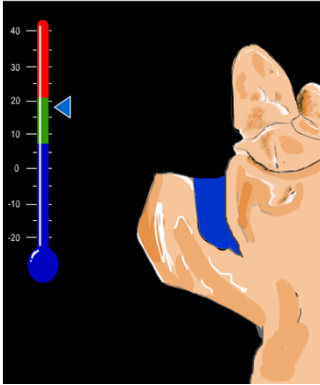
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Freeze-thaw weathering

What is freeze-thaw weathering?

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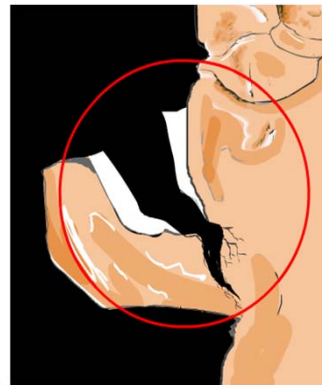
How does freeze-thaw weathering happen?



1. Water finds its way into small cracks in the rock.

What will happen to the water if the temperature drops to 0°C or below?

How does freeze-thaw weathering happen?

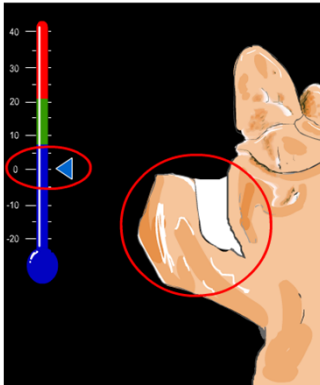


4. Finally a fragment of the rock breaks away completely.

This process is called **freeze-thaw weathering**.

Freeze-thaw weathering is a type of **physical weathering**.

How does freeze-thaw weathering happen?

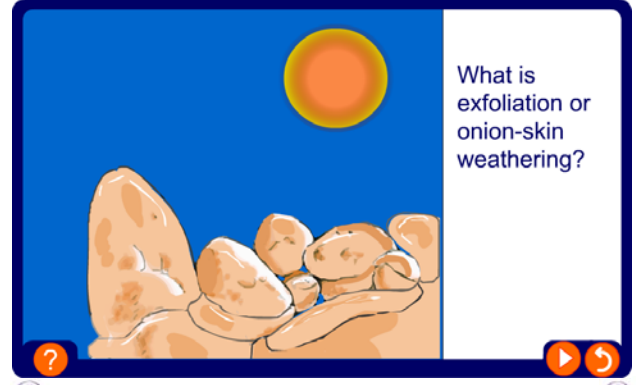


2. At night-time, when the temperature drops to 0°C or below, the water in the crack **freezes** forming ice.

The water expands as it freezes creating huge forces on the surrounding areas of the rock.

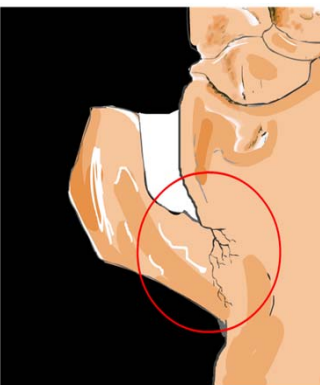
These forces make the crack in the rock get bigger.

Exfoliation or onion-skin weathering



What is exfoliation or onion-skin weathering?

How does freeze-thaw weathering happen?



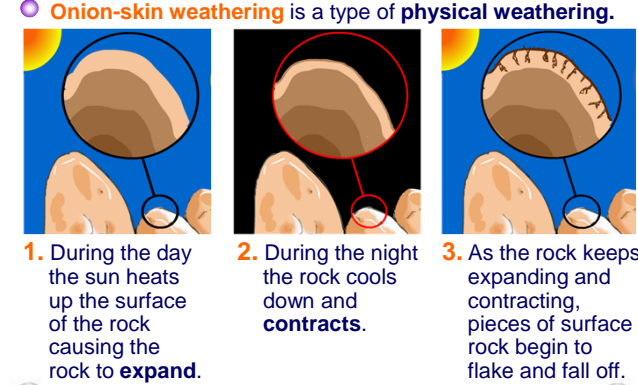
3. During the day, when the temperature warms up again, the frozen water **thaws**.

At night-time this water freezes again.

This cycle of freezing and thawing is repeated over and over again.

The huge forces created cause more cracks to appear in the rock.

How does onion-skin weathering happen?



- Onion-skin weathering is a type of **physical weathering**.

1. During the day the sun heats up the surface of the rock causing the rock to **expand**.
2. During the night the rock cools down and **contracts**.
3. As the rock keeps expanding and contracting, pieces of surface rock begin to flake and fall off.

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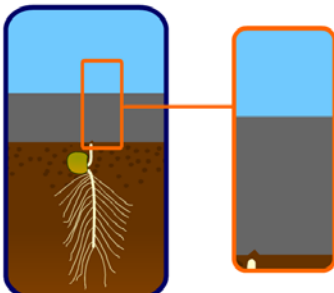
- Physical weathering
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What is biological weathering?

What is biological weathering?

Plant roots and shoots can get into tiny cracks in rocks.




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What is chemical weathering?

0 years


What is chemical weathering?



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Examples of biological weathering


How has **biological weathering** caused these cracks to form?



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Slow and rapid chemical weathering


Slow chemical weathering



Rainwater is **naturally acidic** because carbon dioxide in the air reacts with rainwater to form carbonic acid.

This type of acid rain is weakly acidic and reacts **slowly** with minerals in rock.

Rapid chemical weathering



The burning of fossil fuels produces oxides of sulphur and nitrogen which make rainwater **more acidic**.

This type of acid rain reacts quickly with minerals and weather rock **more rapidly**.

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Examples of chemical weathering

- How has **chemical weathering** affected these rocks?



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What is transportation?

- Transportation is the movement of rock fragments from one place to another.** The rock fragments can be transported in different ways:

by strong winds



by rivers



by glaciers



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What is deposition?

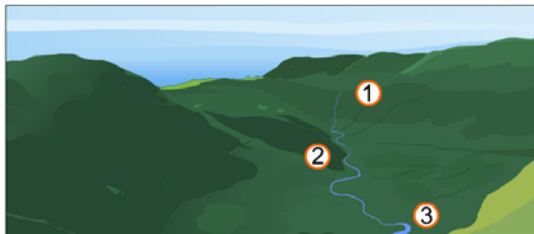
- Deposition occurs when pieces of weathered rock sink to the bottom of the river bed or sea forming sediment.** Dead creatures can get trapped in sediment and form fossils.



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What happens to weathered rock?



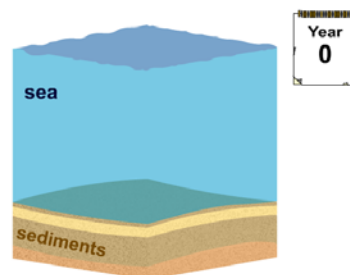
Click on the numbers to find out what happens to weathered rock.

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How are sedimentary rocks formed?

How are sedimentary rocks formed?



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Examples of sedimentary rocks

- How can you tell that these are sedimentary rocks?



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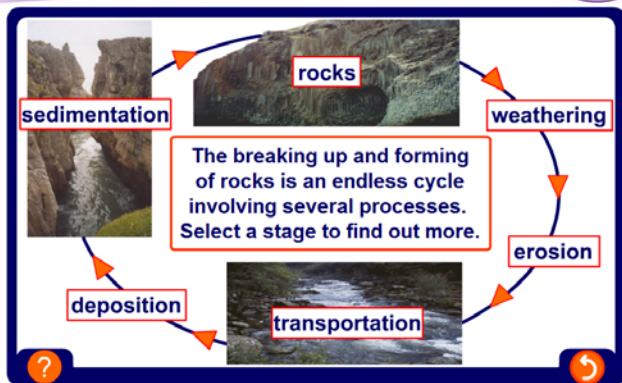
Glossary

- deposition** – The settling of rock fragments after transportation.
- erosion** – The process of weathering and transportation.
- exfoliation** – Weathering of rocks caused by repeated heating and cooling, also called onion-skin weathering.
- freeze-thaw** – Weathering of rocks caused by the repeated freezing and thawing of water in cracks in rocks.
- grain** – A small piece of a mineral which makes up a rock.
- mineral** – A solid substance, usually a compound, which is found in rocks.
- rock** – A mixture of minerals.
- transportation** – Movement of rock fragments from one place to another.
- weathering** – The breakdown of rocks into smaller pieces by physical, chemical and biological processes.

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From weathering to sedimentation



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Anagrams

How quickly can you unscramble anagrams of words about

rocks

and

weathering?

Click "start" for the first of nine anagrams.

start

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Multiple-choice quiz

Are you hard enough to try this quiz about rocks and weathering?



start

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